Lower White Pine Groups 2 & 3

4/1/2016

HIP III CONSERVATION MEASURES

1.0 General Aquatic Conservation Measures Applicable to all Actions.

The activities covered under the HIP III are intended to protect and restore fish and wildlife habitat with long-term benefits to ESA-listed species. However, project construction may have short-term adverse effects on ESA-listed species and associated critical habitat. To minimize these short-term adverse effects and make them predictable for the purposes of programmatic analysis, the BPA will include in all projects implemented under this HIP III proposed action the following general conservation measures (developed in coordination with USFWS and NMFS).

Project Design and Site Preparation.

1) **Climate change.** Best available science regarding the future effects within the project area of climate change, such as changes in stream flows and water temperatures, will be considered during project design.

2) **State and Federal Permits.** All applicable regulatory permits and official project authorizations will be obtained before project implementation. These permits and authorizations include, but are not limited to, National Environmental Policy Act, National Historic Preservation Act, and the appropriate state agency removal and fill permit, USACE Clean Water Act (CWA) 404 permits, and CWA section 401 water quality certifications.

3) **Timing of in-water work.** Appropriate state (Oregon Department of Fish and Wildlife (ODFW), Washington Department of Fish and Wildlife (WDFW), Idaho Department of Fish and Game (IDFG), and Montana Fish Wildlife and Parks (MFWP)) guidelines for timing of in-water work windows will be followed.
   a) Bull trout - While utilizing the appropriate State designated in-water work period will lessen the risk to bull trout, this alone may not be sufficient to adequately protect local bull trout populations. This is especially true if work is occurring in spawning and rearing areas because eggs, alevin, and fry are in the substrate or closely associated habitats nearly year round. Some areas may not have designated in-water work windows for bull trout or if they do, they may conflict with work windows for salmon and steelhead. If this is the case, or if proposed work is to occur within bull trout spawning and rearing habitats, project proponents will contact the appropriate USFWS Field Office to insure that all reasonable implementation measures are considered and an appropriate in-water work window is being used to minimize project effects.
   b) Lamprey – the project sponsor and/or their contractors will avoid working in stream or river channels that contain Pacific Lamprey from March 1 to July 1 in low to mid elevation reaches (<5,000 feet). In high elevation reaches (>5,000 feet), the project sponsor will avoid working in stream or river channels from March 1 to August 1. If either timeframe is incompatible with other objectives, the area will be surveyed for nests and lamprey presence, and avoided if possible. If lampreys are known to exist, the project

sponsor will utilize dewatering and salvage procedures outlined in US Fish and Wildlife Service (2010)[1].

c) Exceptions to ODFW, WDFW, MFWP, or IDFG in-water work windows will be requested through the Variance process (Page 2).

4) **Contaminants.** The project sponsor will complete a site assessment with the following elements to identify the type, quantity, and extent of any potential contamination for any action that involves excavation of more than 20 cubic yards of material:
   a) A review of available records, such as former site use, building plans, and records of any prior contamination events;
   b) A site visit to inspect the areas used for various industrial processes and the condition of the property;
   c) Interviews with knowledgeable people, such as site owners, operators, and occupants, neighbors, or local government officials; and
   d) A summary, stored with the project file that includes an assessment of the likelihood that contaminants are present at the site, based on items 4(a) through 4(c).

5) **Site layout and flagging.** Prior to construction, the action area will be clearly flagged to identify the following:
   a) Sensitive resource areas, such as areas below ordinary high water, spawning areas, springs, and wetlands;
   b) Equipment entry and exit points;
   c) Road and stream crossing alignments;
   d) Staging, storage, and stockpile areas; and
   e) No-spray areas and buffers.

6) **Temporary access roads and paths.**
   a) Existing access roads and paths will be preferentially used whenever reasonable, and the number and length of temporary access roads and paths through riparian areas and floodplains will be minimized to lessen soil disturbance and compaction, and impacts to vegetation.
   b) Temporary access roads and paths will not be built on slopes where grade, soil, or other features suggest a likelihood of excessive erosion or failure. If slopes are steeper than 30%, then the road will be designed by a civil engineer with experience in steep road design.
   c) The removal of riparian vegetation during construction of temporary access roads will be minimized. When temporary vegetation removal is required, vegetation will be cut at ground level (not grubbed).
   d) At project completion, all temporary access roads and paths will be obliterated, and the soil will be stabilized and revegetated. Road and path obliteration refers to the most comprehensive degree of decommissioning and involves decompacting the surface and

[1] U.S. Fish and Wildlife Service. 2010. Best management practices to minimize adverse effects to Pacific lamprey. Available online at: http://www.fws.gov/pacific/Fisheries/sphabcon/lamprey/pdf/Best%20Management%20Practices%20for%20Pacific%20Lamprey%20April%202010%20Version.pdf

ditch, pulling the fill material onto the running surface, and reshaping to match the original contour.

e) Temporary roads and paths in wet areas or areas prone to flooding will be obliterated by the end of the in-water work window.

7) **Temporary stream crossings.**
   a) Existing stream crossings will be preferentially used whenever reasonable, and the number of temporary stream crossings will be minimized.
   b) Temporary bridges and culverts will be installed to allow for equipment and vehicle crossing over perennial streams during construction. Treated wood shall not be used on temporary bridge crossings or in locations in contact with or over water.
   c) Equipment and vehicles will cross the stream in the wet only where:
      i. The streambed is bedrock; or
      ii. Mats or off-site logs are placed in the stream and used as a crossing.
   d) Vehicles and machinery will cross streams at right angles to the main channel wherever possible.
   e) The location of the temporary crossing will avoid areas that may increase the risk of channel re-routing or avulsion.
   f) Potential spawning habitat (i.e., pool tailouts) and pools will be avoided to the maximum extent possible.
   g) No stream crossings will occur at active spawning sites, when holding adult listed fish are present, or when eggs or alevins are in the gravel. The appropriate state fish and wildlife agency will be contacted for specific timing information.
   h) After project completion, temporary stream crossings will be obliterated and the stream channel and banks restored.

8) **Staging, storage, and stockpile areas.**
   a) Staging areas (used for construction equipment storage, vehicle storage, fueling, servicing, and hazardous material storage) will be 150 feet or more from any natural water body or wetland, or on an adjacent, established road area in a location and manner that will preclude erosion into or contamination of the stream or floodplain.
   b) Natural materials used for implementation of aquatic restoration, such as large wood, gravel, and boulders, may be staged within the 100-year floodplain.
   c) Any large wood, topsoil, and native channel material displaced by construction will be stockpiled for use during site restoration at a specifically identified and flagged area.
   d) Any material not used in restoration, and not native to the floodplain, will be removed to a location outside of the 100-year floodplain for disposal.

9) **Equipment.** Mechanized equipment and vehicles will be selected, operated, and maintained in a manner that minimizes adverse effects on the environment (e.g., minimally-sized, low pressure tires; minimal hard-turn paths for tracked vehicles; temporary mats or plates within wet areas or on sensitive soils). All vehicles and other mechanized equipment will be:
   a) Stored, fueled, and maintained in a vehicle staging area placed 150 feet or more from any natural water body or wetland or on an adjacent, established road area;
   b) Refueled in a vehicle staging area placed 150 feet or more from a natural waterbody or wetland, or in an isolated hard zone, such as a paved parking lot or adjacent, established

road (this measure applies only to gas-powered equipment with tanks larger than 5 gallons);

c) Biodegradable lubricants and fluids shall be used on equipment operating in and adjacent to the stream channel and live water.
d) Inspected daily for fluid leaks before leaving the vehicle staging area for operation within 150 feet of any natural water body or wetland; and
e) Thoroughly cleaned before operation below ordinary high water, and as often as necessary during operation, to remain grease free.

10) **Erosion control.** Erosion control measures will be prepared and carried out, commensurate in scope with the action, that may include the following:
a) Temporary erosion controls.
i. Temporary erosion controls will be in place before any significant alteration of the action site and appropriately installed downslope of project activity within the riparian buffer area until site rehabilitation is complete.
ii. If there is a potential for eroded sediment to enter the stream, sediment barriers will be installed and maintained for the duration of project implementation.
iii. Temporary erosion control measures may include fiber wattles, silt fences, jute matting, wood fiber mulch and soil binder, or geotextiles and geosynthetic fabric.
iv. Soil stabilization utilizing wood fiber mulch and tackifier (hydro-applied) may be used to reduce erosion of bare soil if the materials are noxious weed free and nontoxic to aquatic and terrestrial animals, soil microorganisms, and vegetation.
v. Sediment will be removed from erosion controls once it has reached 1/3 of the exposed height of the control.
vi. Once the site is stabilized after construction, temporary erosion control measures will be removed.
b) Emergency erosion controls. The following materials for emergency erosion control will be available at the work site:
i. A supply of sediment control materials; and
ii. An oil-absorbing floating boom whenever surface water is present.

11) **Dust abatement.** The project sponsor will determine the appropriate dust control measures by considering soil type, equipment usage, prevailing wind direction, and the effects caused by other erosion and sediment control measures. In addition, the following criteria will be followed:
a) Work will be sequenced and scheduled to reduce exposed bare soil subject to wind erosion.
b) Dust-abatement additives and stabilization chemicals (typically magnesium chloride, calcium chloride salts, or ligninsulfonate) will not be applied within 25 feet of water or a stream channel and will be applied so as to minimize the likelihood that they will enter streams. Applications of ligninsulfonate will be limited to a maximum rate of 0.5 gallons per square yard of road surface, assuming a 50:50 (ligninsulfonate to water) solution.
c) Application of dust abatement chemicals will be avoided during or just before wet weather, and at stream crossings or other areas that could result in unfiltered delivery of the dust abatement materials to a waterbody (typically these would be areas within 25

feet of a waterbody or stream channel; distances may be greater where vegetation is sparse or slopes are steep).
   d) Spill containment equipment will be available during application of dust abatement chemicals.
   e) Petroleum-based products will not be used for dust abatement.

6) **Spill prevention, control, and counter measures.** The use of mechanized machinery increases the risk for accidental spills of fuel, lubricants, hydraulic fluid, or other contaminants into the riparian zone or directly into the water. Additionally, uncured concrete and form materials adjacent to the active stream channel may result in accidental discharge into the water. These contaminants can degrade habitat, and injure or kill aquatic food organisms and ESA-listed species. The project sponsor will adhere to the following measures:
   a) A description of hazardous materials that will be used, including inventory, storage, and handling procedures will be available on-site.
   b) Written procedures for notifying environmental response agencies will be posted at the work site.
   c) Spill containment kits (including instructions for cleanup and disposal) adequate for the types and quantity of hazardous materials used at the site will be available at the work site.
   d) Workers will be trained in spill containment procedures and will be informed of the location of spill containment kits.
   e) Any waste liquids generated at the staging areas will be temporarily stored under an impervious cover, such as a tarpaulin, until they can be properly transported to and disposed of at a facility that is approved for receipt of hazardous materials.

7) **Invasive species control.** The following measures will be followed to avoid introduction of invasive plants and noxious weeds into project areas:
   a) Prior to entering the site, all vehicles and equipment will be power washed, allowed to fully dry, and inspected to make sure no plants, soil, or other organic material adheres to the surface.
   b) Watercraft, waders, boots, and any other gear to be used in or near water will be inspected for aquatic invasive species.
   c) Wading boots with felt soles are not to be used due to their propensity for aiding in the transfer of invasive species.

Work Area Isolation & Fish Salvage.

Any work area within the wetted channel will be isolated from the active stream whenever ESA-listed fish are reasonably certain to be present, or if the work area is less than 300-feet upstream from known spawning habitats. When work area isolation is required, design plans will include all isolation elements, fish release areas, and, when a pump is used to dewater the isolation area and fish are present, a fish screen that meets NMFS's fish screen criteria (NMFS 2011[2], or most current). Work area isolation and fish capture activities will occur during periods of the coolest air and water temperatures possible, normally early in the morning versus late in the day, and during conditions appropriate to minimize stress and death of species present.

For salvage operations in known bull trout spawning and rearing habitat, electrofishing shall only occur from May 1 to July 31. No electrofishing will occur in any bull trout occupied habitat after August 15. Bull trout are very temperature sensitive and generally should not be electroshocked or otherwise handled when temperatures exceed 15 degrees celsius. Salvage activities should take place during periods of the coolest air and water temperatures possible, normally early in the morning versus late in the day, and during conditions appropriate to minimize stress to fish species present.

Salvage operations will follow the ordering, methodologies, and conservation measures specified below in Steps 1 through 6. Steps 1 and 2 will be implemented for all projects where work area isolation is necessary according to conditions above. Electrofishing (Step 3) can be implemented to ensure all fish have been removed following Steps 1 and 2, or when other means of fish capture may not be feasible or effective. Dewatering and rewatering (Steps 4 and 5) will be implemented unless wetted in-stream work is deemed to be minimally harmful to fish, and is beneficial to other aquatic species. Dewatering will not be conducted in areas known to be occupied by lamprey, unless lampreys are salvaged using guidance set forth in US Fish and Wildlife Service (2010)[3].

1) **Isolate.**
   a) Block nets will be installed at upstream and downstream locations and maintained in a secured position to exclude fish from entering the project area.
   b) Block nets will be secured to the stream channel bed and banks until fish capture and transport activities are complete. Block nets may be left in place for the duration of the project to exclude fish.
   c) If block nets remain in place more than one day, the nets will be monitored at least daily to ensure they are secured to the banks and free of organic accumulation. If the project is within bull trout spawning and rearing habitat, the block nets must be checked every four

[2] National Marine Fisheries Service. 2011. Anadromous salmonid passage facility design. Northwest Region. Available online at: http://www.nwr.noaa.gov/Salmon-Hydropower/FERC/upload/Fish-Passage-Design.pdf

[3] U.S. Fish and Wildlife Service. 2010. Best management practices to minimize adverse effects to Pacific lamprey. Available online at: http://www.fws.gov/pacific/Fisheries/sphabcon/lamprey/pdf/Best%20Management%20Practices%20for%20Pacific%20Lamprey%20April%202010%20Version.pdf

hours for fish impingement on the net. Less frequent intervals must be approved through a variance request.

d) Nets will be monitored hourly anytime there is instream disturbance.

2) **Salvage.** – As described below, fish trapped within the isolated work area will be captured to minimize the risk of injury, then released at a safe site:
   a) Remove as many fish as possible prior to dewatering.
   b) During dewatering, any remaining fish will be collected by hand or dip nets.
   c) Seines with a mesh size to ensure capture of the residing ESA-listed fish will be used.
   d) Minnow traps will be left in place overnight and used in conjunction with seining.
   e) If buckets are used to transport fish:
      i. The time fish are in a transport bucket will be limited, and will be released as quickly as possible;
      ii. The number of fish within a bucket will be limited based on size, and fish will be of relatively comparable size to minimize predation;
      iii. Aerators for buckets will be used or the bucket water will be frequently changed with cold clear water at 15 minute or more frequent intervals.
      iv. Buckets will be kept in shaded areas or will be covered by a canopy in exposed areas.
      v. Dead fish will not be stored in transport buckets, but will be left on the stream bank to avoid mortality counting errors.
   f) As rapidly as possible (especially for temperature-sensitive bull trout), fish will be released in an area that provides adequate cover and flow refuge. Upstream release is generally preferred, but fish released downstream will be sufficiently outside of the influence of construction.
   g) Salvage will be supervised by a qualified fisheries biologist experienced with work area isolation and competent to ensure the safe handling of all fish.

3) **Electrofishing.** Electrofishing will be used only after other salvage methods have been employed or when other means of fish capture are determined to not be feasible or effective. If electrofishing will be used to capture fish for salvage, the salvage operation will be led by an experienced fisheries biologist and the following guidelines will be followed:
   a) The NMFS's electrofishing guidelines (NMFS 2000).
   b) Only direct current (DC) or pulsed direct current (PDC) will be used and conductivity must be tested.
      i. If conductivity is less than 100 µs, voltage ranges from 900 to 1100 will be used.
      ii. For conductivity ranges between 100 to 300 µs, voltage ranges will be 500 to 800.
      iii. For conductivity greater than 300 µs, voltage will be less than 400.
   c) Electrofishing will begin with a minimum pulse width and recommended voltage and then gradually increase to the point where fish are immobilized.
   d) The anode will not intentionally contact fish.
   e) Electrofishing shall not be conducted when the water conditions are turbid and visibility is poor. This condition may be experienced when the sampler cannot see the stream bottom in one foot of water.
   f) If mortality or obvious injury (defined as dark bands on the body, spinal deformations, de-scaling of 25% or more of body, and torpidity or inability to maintain upright attitude after sufficient recovery time) occurs during electrofishing, operations will be

immediately discontinued, machine settings, water temperature and conductivity checked, and procedures adjusted or electrofishing postponed to reduce mortality.

4) **Dewater.** Dewatering, when necessary, will be conducted over a sufficient period of time to allow species to naturally migrate out of the work area and will be limited to the shortest linear extent practicable.
   a) Diversion around the construction site may be accomplished with a coffer dam and a by-pass culvert or pipe, or a lined, non-erodible diversion ditch. Where gravity feed is not possible, a pump may be used, but must be operated in such a way as to avoid repetitive dewatering and rewatering of the site. Impoundment behind the cofferdam must occur slowly through the transition, while constant flow is delivered to the downstream reaches.
   b) All pumps will have fish screens to avoid juvenile fish impingement or entrainment, and will be operated in accordance with NMFS's current fish screen criteria (NMFS 2011[4], or most recent version). If the pumping rate exceeds 3 cubic feet second (cfs), a NMFS Hydro fish passage review will be necessary.
   c) Dissipation of flow energy at the bypass outflow will be provided to prevent damage to riparian vegetation or stream channel.
   d) Safe reentry of fish into the stream channel will be provided, preferably into pool habitat with cover, if the diversion allows for downstream fish passage.
   e) Seepage water will be pumped to a temporary storage and treatment site or into upland areas to allow water to percolate through soil or to filter through vegetation prior to reentering the stream channel.

5) **Salvage Notice.** Monitoring and recording of fish presence, handling, and mortality must occur during the duration of the isolation, salvage, electrofishing, dewatering, and rewatering operations. Once operations are completed, a salvage report will document procedures used, any fish injuries or deaths (including numbers of fish affected), and causes of any deaths.

[4] National Marine Fisheries Service. 2011. Anadromous salmonid passage facility design. Northwest Region. Available online at: http://www.nwr.noaa.gov/Salmon-Hydropower/FERC/upload/Fish-Passage-Design.pdf

Construction and Post-Construction Conservation Measures.

1) **Fish passage.** Fish passage will be provided for any adult or juvenile fish likely to be present in the action area during construction, unless passage did not exist before construction or the stream is naturally impassable at the time of construction. If the provision of temporary fish passage during construction will increase negative effects on aquatic species of interest or their habitat, a variance can be requested from the NMFS Branch Chief and the FWS Field Office Supervisor. Pertinent information, such as the species affected, length of stream reach affected, proposed time for the passage barrier, and alternatives considered, will be included in the variance request.

2) **Construction and discharge water.**
   a) Surface water may be diverted to meet construction needs, but only if developed sources are unavailable or inadequate.
   b) Diversions will not exceed 10% of the available flow.
   c) All construction discharge water will be collected and treated using the best available technology applicable to site conditions.
   d) Treatments to remove debris, nutrients, sediment, petroleum hydrocarbons, metals and other pollutants likely to be present will be provided.

3) **Minimize time and extent of disturbance.** Earthwork (including drilling, excavation, dredging, filling and compacting) in which mechanized equipment is in stream channels, riparian areas, and wetlands will be completed as quickly as possible. Mechanized equipment will be used in streams only when project specialists believe that such actions are the only reasonable alternative for implementation, or would result in less sediment in the stream channel or damage (short- or long-term) to the overall aquatic and riparian ecosystem relative to other alternatives. To the extent feasible, mechanized equipment will work from the top of the bank, unless work from another location would result in less habitat disturbance.

4) **Cessation of work.** Project operations will cease under the following conditions:
   a) High flow conditions that may result in inundation of the project area, except for efforts to avoid or minimize resource damage;
   b) When allowable water quality impacts, as defined by the state CWA section 401 water quality certification or HIPIII Turbidity Monitoring Protocol, have been exceeded; or
   c) When “incidental take” limitations have been reached or exceeded.

5) **Site restoration.** When construction is complete:
   a) All streambanks, soils, and vegetation will be cleaned up and restored as necessary using stockpiled large wood, topsoil, and native channel material.
   b) All project related waste will be removed.
   c) All temporary access roads, crossings, and staging areas will be obliterated. When necessary for revegetation and infiltration of water, compacted areas of soil will be loosened.
   d) All disturbed areas will be rehabilitated in a manner that results in similar or improved conditions relative to pre-project conditions. This will be achieved through redistribution of stockpiled materials, seeding, and/or planting with local native seed mixes or plants.

6) **Revegetation.** Long-term soil stabilization of disturbed sites will be accomplished with reestablishment of native vegetation using the following criteria:
   a) Planting and seeding will occur prior to or at the beginning of the first growing season after construction.
   b) An appropriate mix of species that will achieve establishment, shade, and erosion control objectives, preferably forb, grass, shrub, or tree species native to the project area or region and appropriate to the site will be used.
   c) Vegetation, such as willow, sedge and rush mats, will be salvaged from disturbed or abandoned floodplains, stream channels, or wetlands.
   d) Invasive species will not be used.
   e) Short-term stabilization measures may include the use of non-native sterile seed mix (when native seeds are not available), weed-free certified straw, jute matting, and other similar techniques.
   f) Surface fertilizer will not be applied within 50 feet of any stream channel, waterbody, or wetland.
   g) Fencing will be installed as necessary to prevent access to revegetated sites by livestock or unauthorized persons.
   h) Re-establishment of vegetation in disturbed areas will achieve at least 70% of pre-project conditions within 3 years.
   i) Invasive plants will be removed or controlled until native plant species are well-established (typically 3 years post-construction).

7) **Site access.** The project sponsor will retain the right of reasonable access to the site in order to monitor the success of the project over its life.

8) **Implementation monitoring.** Project sponsor staff or their designated representative will provide implementation monitoring by filling out the Project Completion Form (PCF) to ensure compliance with the applicable biological opinion, including:
   a) General conservation measures are adequately followed; and
   b) Effects to listed species are not greater than predicted and incidental take limitations are not exceeded.
   c) Turbidity monitoring shall be conducted in accordance with the HIPIII turbidity monitoring protocol outlined on the following page and recorded in the Project Completion Form (PCF).

9) **CWA section 401 water quality certification.** The project sponsor or designated representative will complete and record water quality observations to ensure that in-water work is not degrading water quality. During construction, CWA section 401 water quality certification provisions provided by the Oregon Department of Environmental Quality, Washington Department of Ecology, or Idaho Department of Environmental Quality will be followed.

Staged Rewatering Plan.

When appropriate, the project sponsor shall implement a staged rewatering plan for projects that involve introducing streamflow into recently excavated channels under the 2f) **Channel Reconstruction** or 2a) **Improve Secondary Channel and Wetland Habitat Activity category.**

1) Pre-wash the newly excavated channel before rewatering. Turbid wash water will be detained and pumped to the floodplain, rather than discharging to fish-bearing waters.
2) Prepare new channel for water by installing seine at upstream end to prevent fish from moving downstream into new channel until 2/3 of total stream flow is available in that channel. Starting in the early morning, introduce 1/3 of the flow into the new channel over a period of 1-2 hours.
3) Perform monitoring according to HIP III Turbidity Monitoring Protocol (Page 19).
    1) If turbidity exceeds 10% of background, modify the activity to reduce turbidity. In this case, this might mean decreasing the amount of flow entering the new channel and/or correcting any other issues that are causing turbidity (for example – correct a bank that is sloughing, install or correct a BMP, etc.).
    2) Monitor every 2 hours as long as the in stream activity is occurring.
    3) If exceedances occur for more than 2 monitoring intervals in a row (4 hours), then the activity must stop until turbidity reaches background levels. This means that the contractor may have to plug off water supply to the new meander until turbidity is within acceptable levels.
    4) Once turbidity is within 10% of background levels, move on to the next watering stage
4) Prepare to introduce the second 1/3 of the flow (up to a total of 66%) to the new channel by installing seine at upstream end of old channel in order to prevent fish from moving into a partially dewatered channel. Introduce the second 1/3 of the flow over the next 1-2 hours. Salvage fish from the old channel at this time, so that the old channel is fish-free before dropping below 1/3 of the flow. (Note that fish will be temporarily blocked from moving downstream into either channel until 2/3 of the flow has been transitioned to the new channel. This blockage to downstream fish passage is expected to persist for roughly 12 to 14 hours, but fish will still be able to volitionally move out of the channel in the downstream direction.)
5) Perform monitoring as in #2 above.
6) After the second 1/3 of flow is introduced over 2 hours, and once turbidity meets is within 10% of background levels,, then remove seine nets from the new channel and allow fish to move downstream into that channel.
7) Introduce the final 1/3 of flow. Once 100% of the flow is in the new channel, plug/pull nets from old channel.

HIP III Turbidity Monitoring Protocol.

The Project Sponsor shall complete and record the following water quality observations to ensure that any increase in suspended sediment is not exceeding the limit for HIPIII compliance. Records shall be reported on the HIPIII Project Completion Form (PCF).

If the geomorphology of the project area (silty or claylike materials) or the nature of the action (large amounts of bare earth exposed below the bankfull) shall preclude the successful compliance with these triggers, notify your EC_Lead who shall pre-notify the Services of a likely exceedance.

1. Take a background turbidity sample using an appropriately and frequently calibrated turbidimeter in accordance with manufacturer's instructions, or a visual turbidity observation, every 2 hours while work is being implemented, or more often if turbidity disturbances vary greatly, to ensure that the in-water work area is not contributing visible sediment to the water column. The background samples or observations should be taken at a relatively undisturbed area approximately 100 feet upstream from the project area. Record the observation, location, and time before monitoring at the downstream point.

2. Take a second sample or observation, immediately after each upstream sample or observation, approximately 50 feet downstream from the project area in streams that are 30 feet wide or less; 100 feet downstream from the project area for streams between 30 and 100 feet wide; 200 feet downstream from the project area for streams greater than 100 feet wide; and 300 feet from the discharge point or nonpoint source for areas subject to tidal or coastal scour. Record the downstream observation, location, and time.

3. Compare the upstream and downstream observations/samples. If observed or measured turbidity downstream is more than upstream observation or measurement (> 10%), the activity must be modified to reduce turbidity. If visual estimates are used, an obvious difference between upstream and downstream observations shall bear the assumption of a (> 10%) difference. Continue to monitor every 2 hours as long as instream activity continues.

4. If exceedances occur for more than two monitoring intervals in a row (after 4 hours), the activity must stop until the turbidity level returns to background, and the EC lead must be notified within 48 hours. The EC lead shall document the reasons for the exceedance, corrective measures taken, notify the local NMFS branch chief and/or USFWS field supervisor and seek recommendations.

5. If at any time, monitoring, inspections, or observations/samples show that the turbidity controls are ineffective, immediately mobilize work crews to repair, replace, or reinforce controls as necessary.

Stormwater Management Guidance

The project proponent must provide stormwater management for any project that will: increase the contributing impervious area within the project area; construct new pavement that increases capacity or widens the road prism; construct pavement down to subgrade; rehabilitate or restore a bridge to repair structural or functional deficiencies that are too complicated to be corrected through normal maintenance, except for seismic retrofits that make a bridge more resistant to earthquake damage (e.g., external post-tensioning, supplementary dampening) but do not affect the bridge deck or drainage; replace a stream crossing; change stormwater conveyance. Stormwater management is not required for the following pavement actions: minor repairs, patching, chip seal, grind/inlay, overlay or resurfacing (i.e., non-structural pavement preservation, a single lift or inlay).

Stormwater management consists of:

1) Water quality (pollution reduction) treatment for post-construction stormwater runoff from all contributing impervious area.
2) Water quantity treatment
    a) Water quantity (flow) management for runoff from all contributing impervious area that will discharge into an intermittent or perennial water body in a watershed that is smaller than 100 mi^2, unless the outfall discharges directly into a lake, reservoir, or estuary.

OR

    b) Water quantity (flow) management for runoff from all contributing impervious area that will discharge more than 0.5 cfs during the 2-year, 24-hour storm into an intermittent or perennial water body in a watershed smaller than 100 mi^2, unless the outfall discharges directly into a lake, reservoir, or estuary.

Stormwater management plans must:

1) Explain how highway runoff from all contributing impervious area that is within or contiguous with the project area will be managed using site sketches, drawings, specifications, calculations, or other information commensurate with the scope of the action.
2) Identify the pollutants of concern.
3) Identify all contributing and non-contributing impervious areas that are within and contiguous with the project area.
4) Describe the BMPs that will be used to treat the identified pollutants of concern, and the proposed maintenance activities and schedule for the treatment facilities.
5) Provide a justification for the capacity of the facilities provided based on the expected runoff volume, including, e.g., the design storm, BMP geometry, analyses of residence time, as appropriate.
6) Include the name, email address, telephone number of a person responsible for designing the stormwater management facilities so that NMFS may contact that person if additional information is necessary.

All stormwater quality treatment practices and facilities must be designed to accept 50% of the cumulative rainfall from the 2-year, 24-hour storm for that site, except as follows: climate zone 4 – 67%; climate zone 5 – 75%; and climate zone 9 – 67%. A continuous rainfall/runoff model may be used instead of the above runoff depths to calculate water quality treatment depth.

Use low impact development practices to infiltrate or evaporate runoff to the maximum extent feasible. For runoff that cannot be infiltrated or evaporated and therefore will discharge into surface or subsurface waters, apply one or more of the following specific primary treatment practices, supplemented with appropriate soil amendments:

1) Bioretention cell
2) Bioslope, also known as an "ecology embankment"
3) Bioswale
4) Constructed wetlands
5) Infiltration pond
6) Media filter devices with demonstrated effectiveness
7) Porous pavement, with no soil amendments and appropriate maintenance

All stormwater flow control treatment practices and facilities must be designed to maintain the frequency and duration of flows generated by storms within the following end-points:

1) Lower discharge endpoint, by USGS flood frequency zone:
    a. Western Region = 42% of 2-year event
2) Eastern Region
    a. Southeast, Northeast, North Central = 48% of 2-year event
    b. Eastern Cascade = 56% of 2-year event
3) Upper discharge endpoint
    a. Entrenchment ratio <2.2 = 10-year event, 24-hour storm
    b. Entrenchment ratio >2.2 = bank overtopping event

When conveyance is necessary to discharge treated stormwater directly into surface water or a wetland, the following requirements apply:

1) Maintain natural drainage patterns.
2) To the maximum extent feasible, ensure that water quality treatment for highway runoff from all contributing impervious area is completed before commingling with offsite runoff for conveyance.

Fish Passage Restoration (Transportation)

1f: Bridge and Culvert Removal or Replacement

Description. For unimpaired fish passage it is desirable to have a crossing that is a larger than the channel bankfull width, allows for a functional floodplain, allows for a natural variation in bed elevation, and provides bed and bank roughness similar to the upstream and downstream channel. In general, bridges will be implemented over culverts because they typically do not

constrict a stream channel to as great a degree as culverts and usually allow for vertical movement of the streambed (see #3 below). Bottomless culverts may provide a good alternative for fish passage where foundation conditions allow their construction and width criteria can be met. Closed bottom or embedded pipes are the least preferred option and shall be at least nine feet in diameter to fulfill stream simulation requirements below.

Conservation Measures:

1) A crossing (utilizing an open bottom technique) shall:
    a) Maintain the general scour prism, as a clear, unobstructed opening (i.e., free of any fill, embankment, scour countermeasure, or structural material).
    b) Be a single span structure that maintains a clear, unobstructed opening above the general scour elevation (2-year recurrence interval) that is at least as wide as 1.5 times the bankfull width (Figure 1).
    c) Be a multiple span structure that maintains a clear, unobstructed opening above the general scour elevation, except for piers or interior bents, that is at least as wide as 2.2 times the bankfull width.

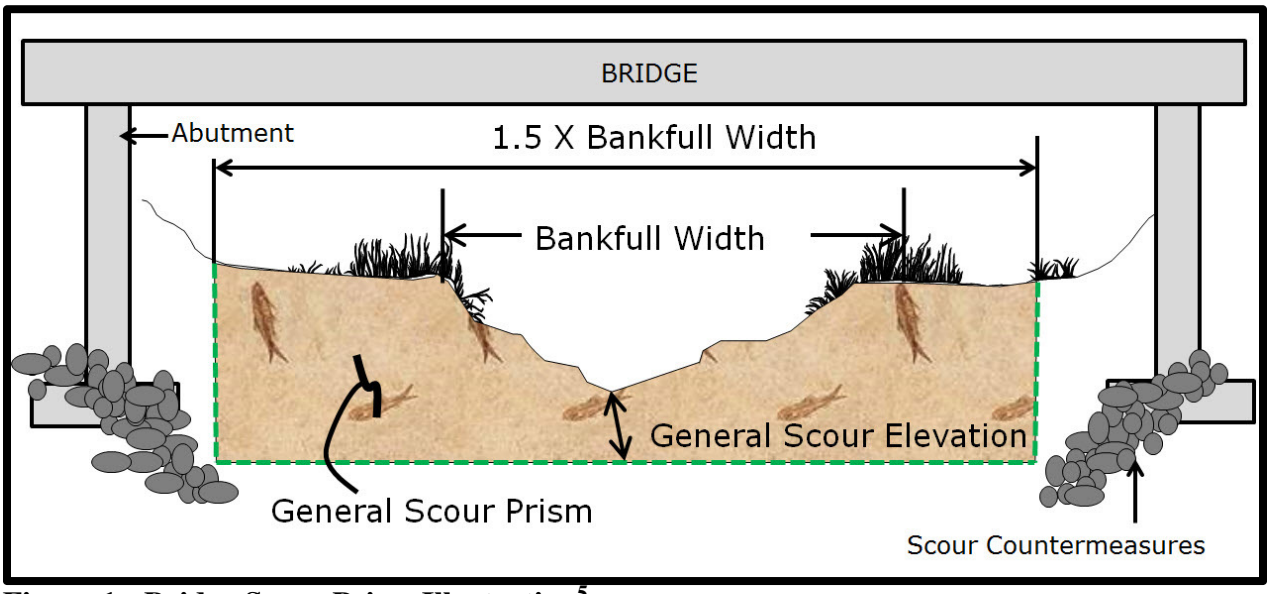

Figure 1: Bridge Scour Prism Illustration[5].

2) Bridge scour and stream stability countermeasures may be applied below the general scour elevation, however, except as described above in (1c), no scour countermeasure may be applied above the general scour elevation.
3) Remove all other artificial constrictions within the functional floodplain of the project area as follows:
    a) Remove existing roadway fill, embankment fill, approach fill, or other fills.
    b) Install relief conduits through existing fill.
    c) Remove vacant bridge supports below total scour depth, unless the vacant support is part of the rehabilitated or replacement stream crossing.

[5] For guidance on how to complete bridge scour and stream stability analysis, refer to page 33 in this document.

   d) Reshape exposed floodplains and streambanks to match upstream and downstream conditions.
4) If the crossing will occur within 300 feet of active spawning area, only full span bridges or streambed simulation (continuous streambed that simulates natural channel width, depth, and slope connects the reaches up and downstream of the crossing) will be used:
   a) **Channel Vertical Clearance:** The minimum vertical clearance between the culvert bed and ceiling should be more than 6 feet
   b) **Channel Slope:** The slope of the reconstructed streambed within the culvert should approximate the average slope of the adjacent stream from approximately ten channel widths upstream and downstream of the site in which it is being placed, or in a stream reach that represents natural conditions outside the zone of the road crossing influence.
   c) **Embedment:** If a culvert is used, the bottom of the culvert should be buried into the streambed not less than 30% and not more than 50% of the culvert height, and a minimum of 3 feet.
   d) **Maximum Length of Road Crossing:** The length for streambed simulation should be less than 150 feet.
   e) **Fill Materials:** Fill materials should be comprised of materials of similar size composition to natural bed materials that form the natural stream channels adjacent to the road crossing.
   f) **Water Depth and Velocity:** Water depth and velocity must closely resemble those that exist in the adjacent stream.
5) Structure material must be concrete, metal, or untreated wood. Concrete must be sufficiently cured or dried[6] before coming into contact with stream flow. The use of treated wood for bridge construction or replacement is not allowed.
6) Projects in stream channels with gradients above six percent will utilize a bridge or open bottom culvert.
7) The minimum culvert width must be 1.5 times the bankfull width.
8) Culvert length shall not be longer than:
   a) 150 feet for stream simulation
   b) 75 feet for no-slope
9) The proponent shall include suitable grade controls to prevent culvert failure caused by changes in stream elevation. Grade control structures to prevent headcutting above or below the culvert or bridge may be built using rock or wood as outlined in the **Headcut and Grade Stabilization** criteria under the **Profile Discontinuity** activity subcategory.

River, Stream, and Floodplain Restoration

2a: Improve Secondary Channel and Wetland Habitats

Description. BPA proposes to review and fund projects that reconnect historical stream channels within floodplains, restore or modify hydrologic and other essential habitat features of historical river floodplain swales, abandoned side channels, spring-flow channels, wetlands, historical floodplain channels and create new self-sustaining side channel habitats which are maintained through natural processes.

[6] NMFS recommends 48 to 72 hours, depending on temperature.

Actions include the improvement and creation of secondary channels, off channel habitats and wetlands to increase the available area and access to rearing habitat; increase hydrologic capacity, provide resting areas for fish and wildlife species at various levels of inundation; reduce flow velocities; and provide protective cover for fish and other aquatic species.

Reconnection of historical off- and side channels habitats that have been blocked includes the removal of plugs, which impede water movement through off- and side-channels. Excavating pools and ponds in the historic floodplain/channel migration zone to create connected wetlands; Reconnecting existing side channels with a focus on restoring fish access and habitat forming processes (hydrology, riparian vegetation); Wetland habits will be created to reestablish a hydrologic regime that has been disrupted by human activities, including functions such as water depth, seasonal fluctuations, flooding periodicity, and connectivity.

All activities intended for improving secondary channel habitats will provide the greatest degree of natural stream and floodplain function achievable and shall be implemented to address basin specified limiting factors. The long-term development of a restored side channel will depend on natural processes like floods and mainstem migration.

If more than 20% of the amount of water from the main channel shall be diverted into the secondary channel then the action shall be considered Channel Reconstruction (pg. 46).

Conservation measures:

1) Off- and side-channel improvements can include minor excavation ($\leq$ 10%) of naturally accumulated sediment within historical channels. Evidence of historical channel location, such as land use surveys, historical photographs, topographic maps, remote sensing information, or personal observation. There is no limit as to the amount of excavation of anthropogenic fill within historic side channels as long as such channels can be clearly identified through field and/or aerial photographs.
2) Designs must demonstrate sufficient hydrology and that the project will be self-sustaining over time. Self-sustaining means the restored or created habitat would not require major or periodic maintenance, but function naturally within the processes of the floodplain.
3) Proposed new side channel construction must be within the functional floodplain (5-year recurrence interval), current channel meander migration zone, and require limited excavation for construction. Reconnection of historical fragmented habitats are preferred.
4) Side channel habitat will be constructed to prevent fish stranding by providing a continual positive **overall** grade to the intersecting river or stream, or by providing a year-round water connection.
5) Excavated material removed from off- or side-channels shall be hauled to an upland site or spread across the adjacent floodplain in a manner that does not restrict floodplain capacity. Hydric soils may be salvaged to provide appropriate substrate and/or seed source for hydrophytic plant community development. Hydric soils will only be obtained from wetland salvage sites.
6) Excavation depth will never exceed the maximum thalweg depth in the main channel.
7) Restoration of existing side channels including one-time dredging and an up to two times project adjustment including adjusting the elevation of the created side channel habitat.

8) All side channel and pool habitat work will occur in isolation from waters occupied by ESA-listed salmonid species until project completion, at which time a final opening may be made by excavation to waters occupied by ESA-listed salmonid or water will be allowed to return into the area.
9) Adequate precautions will be taken to prevent the creation of fish passage issues or stranding of juvenile or adult fish by demonstrating sufficient hydrologic conditions.
10) **Rewatering stream channels**. For stream channels which have been isolated and dewatered during project construction:
    a) Reconstructed stream channels will be "pre-washed" into a reach equipped with sediment capture devices, prior to reintroduction of flow to the stream.
    b) Stream channels will be re-watered slowly to minimize a sudden increase in turbidity (see Staged Rewatering Plan).

2d: Install Habitat-Forming Natural Material Instream Structures (LW, Boulders, and Spawn Gravel)

Description. BPA proposes to review and fund projects that include placement of natural habitat forming structures to provide instream spawning, rearing and resting habitat for salmonids and other aquatic species. Projects will provide high flow refugia; increase interstitial spaces for benthic organisms; increase instream structural complexity and diversity including rearing habitat and pool formation; promote natural vegetation composition and diversity; reduce embeddedness in spawning gravels and promote spawning gravel deposition; reduce siltation in pools; reduce the width/depth ratio of the stream; mimic natural input of LW (e.g., whole conifer and hardwood trees, logs, root wads); decrease flow velocities; and deflect flows into adjoining floodplain areas to increase channel and floodplain function. In areas where natural gravel supplies are low (immediately below reservoirs, for instance), gravel placement can be used to improve spawning habitat.

Anthropogenic activities that have altered riparian habitats, such as splash damming and the removal of large wood and logjams, have reduced instream habitat complexity in many rivers and have eliminated or reduced features like pools, hiding cover, and bed complexity. Salmonids need habitat complexity for rearing, feeding, and migrating. To offset these impacts large wood, boulders and spawning gravel will be placed in stream channels either individually or in combination.

Large wood will be placed to increase coarse sediment storage, increase habitat diversity and complexity, retain gravel for spawning habitat, improve flow heterogeneity, provide long-term nutrient storage and substrate for aquatic macroinvertebrates, moderate flow disturbances, increase retention of leaf litter, and provide refugia for fish during high flows. Engineered log jams create a hydraulic shadow, a low-velocity zone downstream that allows sediment to settle out. Scour holes develop adjacent to the log jam which can provide valuable fish and wildlife habitat by redirecting flow and providing stability to a streambank or downstream gravel bar.

Boulder placements increase habitat diversity and complexity, improve flow heterogeneity, provide substrate for aquatic vertebrates, moderate flow disturbances, and provide refuge for fish

during high flows. The placement of individual large boulders and boulder clusters to increase structural diversity is important to provide holding and rearing habitat for ESA-listed salmonids where similar natural rock has been removed. This treatment will be used in streams that have been identified as lacking structural diversity and that are naturally and/or historically have had boulders.

The quality and quantity of available spawning gravel has been impacted by many anthropogenic features and activities. For example, dams and culverts can block the downstream movement of gravel and result in gravel starved reaches. Channelization, hard streambank stabilization, and diking restrict a stream from meandering and recruiting gravel. Elimination of riparian buffers and grazing up to the stream's edge introduces fines that often cause embedded or silted-in spawning gravel. Spawning gravel will be placed to improve spawning substrate by compensating for an identified loss of a natural gravel supply and may be placed in conjunction with other projects, such as simulated log jams and boulders.

All activities intended for installing habitat-forming instream structures will provide the greatest degree of natural stream and floodplain function achievable through application of an integrated, ecological approach and linkage to basin defined limiting factors. Instream structures capable of enhancing habitat forming processes and migratory corridors will be installed only within previously degraded stream reaches, where past disturbances have removed habitat elements such as LW, boulders, or spawning gravel.

This project activity category can only be covered if ancillary to other stream habitat restoration actions.

Conservation measures (Large Wood):

1) Large wood placements must mimic natural accumulations of large wood in the channel, estuary, or marine environment and addresses basin defined limiting factors.
2) LW placements for other purposes than habitat restoration or enhancement are excluded from this consultation.
3) LW will be placed in channels that have an intact, well-vegetated protected riparian buffer (35 feet), or in conjunction with riparian rehabilitation or management.
4) Stabilizing or key pieces of large wood that will be relied on to provide streambank stability or redirect flows must be intact, hard, and undecayed to partly decaying, and should have untrimmed root wads to provide functional refugia habitat for fish. Use of decayed or fragmented wood found lying on the ground or partially sunken in the ground is not acceptable for key pieces but may be incorporated to add habitat complexity.
5) LW anchoring will not utilize cable or chain. Manila, sisal or other biodegradable ropes may be used for lashing connections. If hydraulic conditions warrant use of structural connections then rebar pinning or bolting may be used. The utilization of structural connections should be used minimally and only to ensure structural longevity in high energetic systems such as (high gradient systems with lateral confinement and limited floodplain). Need for structural anchorage shall be demonstrated in the design documentation.
6) Rock may be used for ballast but only to what is limited to that is needed to anchor the LW.

Conservation measures (Boulder Placement):

1) Boulder placements for other purposes than habitat restoration or enhancement are not covered under HIP III.
2) Boulder placements will be limited to stream reaches with an intact, well-vegetated riparian area, including trees and shrubs where those species would naturally occur, or that are part of riparian area restoration action; and a stream bed that consists predominantly of coarse gravel or larger sediments.
3) The cross-sectional area of boulder placements may not exceed 25% of the cross-sectional area of the low flow channel.

4) Boulder placements may not be installed with the purpose of shifting the stream flow to a single flow pattern in the middle or to the side of the stream.

5) Boulders will be machine-placed (no end dumping allowed) and will rely on the size of boulder for stability.
6) Boulders will be installed low in relation to channel dimensions so that they are completely overtopped during channel-forming flow events (approximately a 2-year flow event).
7) Permanent anchoring, including rebar or cabling, may not be used.

Conservation measures (Spawning Gravel):

1) Spawning gravel augmentation is limited to areas where the natural supply has been eliminated or significantly reduced through anthropogenic means.
2) Spawning gravel to be placed in streams must be obtained from an upland source outside of the channel and riparian area and properly sized gradation for that stream, clean, and non-angular.
3) A maximum of 100 cubic yards of spawning sized gravel can be imported or relocated and placed upstream of each structure.
4) Spawning gravel must be used in combination with other restoration activities that address the underlying systematic problem. For example a combined project consisting of: planting streambank vegetation, placing instream LW and supplementing spawning gravel.

2e: Riparian Vegetation Planting

Description. BPA proposes to fund vegetation planting to recover watershed processes and functions associated with native plant communities and that will help restore natural plant species composition and structure. Under this activity category, project proponents would plant trees, shrubs, herbaceous plants, and aquatic macrophytes to help stabilize soils. Large trees such as cottonwoods and conifers will be planted in areas where they historically occurred but are currently either scarce or absent. Native plant species and seeds will be obtained from local sources to ensure plants are adapted to local climate and soil chemistry.

Vegetation management strategies will be utilized that are consistent with local native succession and disturbance regimes and specify seed/plant source, seed/plant mixes, and soil preparation. Planting will address the abiotic factors contributing to the sites' succession, *i.e.*, weather and disturbance patterns, nutrient cycling, and hydrologic condition. Only certified noxious weed-free seed (99.9%), hay, straw, mulch, or other vegetation material for site stability and revegetation projects will be utilized.

Conservation measures:

1) An experienced silviculturist, botanist, ecologist, or associated technician shall be involved in designing vegetation treatments.
2) Species to be planted must be of the same species that naturally occurs in the project area.
3) Tree and shrub species as well as sedge and rush mats to be used as transplant material shall come from outside the bankfull width, typically in abandoned flood plains, and where such plants are abundant.
4) Sedge and rush mats should be sized as to prevent their movement during high flow events.
5) Concentrate plantings above the bankfull elevation.
6) Species distribution shall mimic natural distribution in the riparian and floodplain areas.

Sponsor Signature

As a condition of funding, I acknowledge my responsibility to ensure that the project as described will meet all of the applicable general and specific conservation measures, in addition to all the applicable terms and conditions of the HIP III Biological Opinion, unless NMFS and/or USFWS has approved a variance request.

_____ _____

Project Sponsor's Signature Date